METAL PROGRESS

Volume 59; January 1951 to June 1951

Ernest E. Thum
Editor

John Parina, Jr.
Associate Editor

Metal Progress Is Owned, Published and Copyrighted by
THE AMERICAN SOCIETY FOR METALS
William H. Eisenman, *Secretary*
7301 Euclid Avenue, Cleveland 3, Ohio

The American Society for Metals is not responsible for statements or opinions printed in this publication.

Table of Contents for Vol. 59

Advances in Production Methods in Metal Finishing, by Adolph Bregman 77
Age Hardenable High-Nickel Alloys, by W. A. Mudge 529
Aging of Al-Cu-Ti Alloys, by H. K. Hardy *(a)* 864
Alloys of Al-Zn-Mg-Cu, by A. Saulnier and G. Gabane *(a)* 284
Aluminum-Rich Binary Alloys, Compiled by F. R. Morral *(d)* 672-B
Annealing of Titanium and Zirconium, by A. M. Bounds and H. W. Cooper 69
Antimony Plate, by Adolph Bregman 245
Birth of S.A.E. 4340, by Harry W. McQuaid 669
Bonding of Titanium Carbide With Metal, by Walter J. Engel 664
Brass and Bronze Foundry Methods, Compiled by the Non-Ferrous Metals Technical Committee, Society of Automotive Engineers *(a)* 844
Bright Hardening, Carburizing and Carbonitriding, by Harold Ipsen and R. Krogh 232
Carbide Phase in Tempered Steel, by M. P. Arbuzov *(a)* 878
Casting-In of Inconel Tubes in Copper Blocks, by F. J. Lambert 809
Centrifugal Castings for Turbines, by J. Taylor and D. H. Armitage *(a)*.. 868
Ceramic Coatings for Molybdenum, by D. G. Moore, L. H. Bolz and W. N. Harrison *(a)* 872
Chromium-Plated Aluminum, by Ernst Raub *(a)* 412
Correction
to Galvanic Macro-Etch for High-Purity Aluminum, November 1950 *(c)* 375
Corrosion of Magnesium Alloys, by Hugh L. Logan and Harold Hessing *(a)* 408
Corrosion of Marine Condenser Systems, by I. G. Slater, L. Kenworthy and B. May *(a)* 273
Corrosion Resistance of Wrought Iron and Steel Pipe, by S. L. Case 378
Corrosion Resistance of Wrought Iron and Steel Pipe, by Elmer Gammeter *(c)* 814
Cost of Corrosion, by Herbert H. Uhlig *(a)* 414
Cost of Welding Stabilized Stainless, by David W. McDowell, Jr. 650
Creep of Pure Zinc, by A. H. Cottrell and V. Aytekin *(a)* 290
Critical Points
Fabricated Parts Versus Steel Castings 643
Fatigue Is Where Metal Is Thickest 644
Hello! 53
Help! 53
Low Alloy Better Than High Alloy 645
Power From the Atom 243
Productivity of Labor in Steelmaking 244
Studies on Core Mixtures 645
Studies on Jet Engines 243
Substitutions 51
Turbine Runners 643
Wanted: A Specialized Foundry .. 644
World Metallurgical Congress 787
Cyclic Annealing, by J. H. Faupel *(c)* 249
Data Sheets
Aluminum-Rich Binary Alloys, Compiled by F. R. Morral 672-B
Etching Sigma Phase, by John J. Gilman 376-B
Heat Treatment of Age Hardenable High-Nickel Alloys, by The International Nickel Co. 528-B
Interconversion of Atomic % and Weight %, by Robert J. Raudebaugh 248-B
Microstructure of Titanium, by H. P. Roth 816-B
Physical Properties of Some Liquid Metals, Compiled by R. R. Miller 80-B
Decade of Metallurgical Science, by J. C. Chaston, with a Rejoinder by Clarence Zener *(c)* 374
Differentiation of Grain Size and Phases in Titanium, by Constance B. Craver 371
Effect of Nuclear Radiation on Metals, by J. T. Richards *(c)* 249
Effect of Repeated Machine Welding, Babcock and Wilcox Co., Report No. 3363 *(a)* 562
Effect of Shot Peening on the Brittle Transition Temperature, by John R. Low, Jr. *(c)* 248
Emergency Steels 376
Etching Sigma Phase, by John J. Gilman *(d)* 376-B
Etching Steels Which Contain the Sigma Phase, by John J. Gilman.... 377
European Research on Flame Radiation, by Tom Bishop *(c)* 248
Fabricated Parts Versus Steel Castings *(cp)* 643
Fatigue Is Where Metal Is Thickest *(cp)* 644
Fatigue Strength of Cold Worked Aluminum, by R. Jacquesson and P. Laurent *(a)* 422
Flow Test of Hubbing Steel, by Folke Haiward 356
Forgeable Arc-Melted Tungsten, by Harry B. Goodwin and Charles T. Greenidge 812
4000° Furnace, by W. E. Few and G. K. Manning 364
Free Cone Bend Test, by W. Thompson *(a)* 840
Galvanic Macro-Etch for High-Purity Aluminum, November issue, Correction *(c)* 375
German Light Metal Industry, British Intelligence Report No. 23 *(a)* 426
Heat Treatment in Wartime Germany, British Intelligence Objectives Subcommittee Over-All Report No. 15 *(a)* 266
Heat Treatment of Age Hardenable High-Nickel Alloys, by The International Nickel Co., Inc. *(d)* 528-B
Hello! *(cp)* 53
Help! *(cp)* 53
High Machinability and Productivity of Ductile Iron, by John F. Kahles, Norman Zlatin and Richard B. Kropf 238
High-Temperature Problems in Aircraft Jet Engines and Turbo-Superchargers, by R. B. Johnson 503
High-Temperature Steels and Alloys for Gas Turbines, Report by Tom Bishop 653
Hot Metal Machining, by Sam Tour.. 793
Hot Working of Copper and Alloys, by Maurice Cook and Edwin Davis *(a)* 116
Hydrogen Theory for Brittle Ship-Plate, by Carl A. Zapffe 802
Improvements in Furnaces and Methods for Heat Treatment, by Floyd E. Harris 63
Instrumentation for Metallurgy, by R. R. Webster 87
Instrumentation in Steelmaking, Reported by R. A. Lambert 657
Interchangeability of Cb and Ta in Type 347 Stainless, by W. O. Binder 219
Interconversion of Atomic % and Weight %, by Robert J. Raudebaugh *(d)* 248-B
Investment Casting, by H. E. Gresham and A. Dunlop *(a)* 874
Is the Reduction of Iron Ore by Hydrogen a Commercial Possibility?, a Debate by P. E. Cavanagh and Harry W. McQuaid 523
Library Use of a New Indexing System, by David L. Edelman 526
Low Alloy Better Than High Alloy *(cp)* 645
Manufacture of Quality Steel in Russia, by N. H. Polakowski 359
Materials for Fluorine Control Equipment, by G. E. Zima and R. N. Doescher 660
Mechanism of Primary Creep, by W. A. Wood and R. F. Scrutton *(a)*... 410
Metal Failures in Aircraft, by W. B. F. Mackay and R. L. Dowdell 518
Metal Finishing of Household Equipment at Servel's Plant, by Adolph Bregman 646
Metal-to-Glass Seal, by J. E. Stanworth *(a)* 556
Metallurgical Activities at Aberdeen Proving Ground, as Observed by The Editor 499
MgO-TiN-NiO Cermets, by L. D. Hower *(a)* 566
Microstructure of Titanium, by H. P. Roth *(d)* 816-B
Modern Trends in Airframe Materials, by Leo Schapiro 511
More Manganese From American Ores and Slags, by E. C. Wright 347
Mouse and House, by C. A. Zapffe and F. K. Landgraf *(c)* 375
New Type of Cupola, by Tom Bishop *(c)* 376
Nominating Committee for National Officers, American Society for Metals 536
Correction 670
Origin and Use of Clad Steel Plate, by William G. Theisinger 671
Partial Stabilization of Stainless Steels, by Stephen F. Urban *(c)* 815
Physical Properties of Some Liquid Metals, Compiled by R. R. Miller *(d)* 80-B
Power From the Atom *(cp)* 243
Preparation of Very Fine Wire by Electropolishing, by William H. Colner, Morris Feinleib and Howard T. Francis 795
Prepared Pastes for Brazing Material, by L. G. Klinker 71
Pressure-Welded Copper Alloys, by Edwin Davis and Eric Holmes *(a)* 544
Productivity of Labor in Steelmaking *(cp)* 244
Progress in Electric Steelmaking, by Sidney W. Poole 93
Protection of Refractory Metals, by H. Buecklе *(a)* 288
Pure Iron, National Physical Laboratory, England *(a)* 405
Pure Metals, by Earle E. Schumacher *(a)* 280
Relation of Structure of Stainless Steel to Hot Ductility, by F. K. Bloom, W. C. Clarke, Jr., and P. A. Jennings 250
Research and the Pilot Foundry, by Harold J. Roast 668
Review of Tracer Techniques in Metallurgy, by G. H. Guest 366
Rolling of Powder Metals, by G. Naesen and F. Zirm *(a)* 586
Room Temperature Creep and Relaxation, by I. A. Oding and E. N. Volosatova *(a)* 546
Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion by James B. Austin, John Chipman, Thomas G. Digges, Elmer Gammeter, Walter E. Jominy, Fred J. Robbins and Ernest E. Thum 817
Sims, Clarence Edgar *(b)* 354
SiO in Acid Steel, by P. V. Gel'd, A. I. Kholodov and N. N. Buinov *(a)* 552
Small Watch Parts, by G. E. Shubrooks *(c)* 815
Soft Soldering in Production, by Charles H. Yetman 74
Sparking Magnesium, by Allen S. Russell 228
Spherical Pressure Tank Welded From Stainless Plate (Pictorial Story) .. 516
Spherulite Formation in Nodular Cast Iron, by A. L. De Sy 798
Spinning Flanged and Dished Wrought Iron Heads, by Edward B. Story *(c)* 375

(a) Abstract; *(b)* Biography; *(c)* Correspondence; *(cp)* Critical Points; *(d)* Data Sheet.

Stainless Is Growing Apace, by Richard E. Paret 58
Steel for Plastic Molds, by Lester F. Spencer *(a)* 402
Studies on Core Mixtures *(cp)* 645
Studies on Jet Engines *(cp)* 243
Substitutions *(cp)* 51
Ten Years in Steel, by Harry W. McQuaid 55
Titanium Resists Stress Corrosion, by H. H. Uhlig and J. R. Cobb, Jr. *(c)* 816
Tools for High Production, by S. K. Rudorf 81
Turbine Runners *(cp)* 643
Unconventional Methods in Powder Metallurgy, by G. Wassermann *(a)* 550
Use of Finely Divided Metals in Explosives, by D. Hart and W. R. Tomlinson, Jr. 788
Vacuum Fusion, by J. Hochmann *(a)* 852
Variables Encountered in Tracer Experiments in Metallurgy, by C. Dean Starr, John R. Lewis and Thomas J. Parmley 673
Vibration of Liquid Mg-Al Alloys, by Charlotte Siebers and Walter Bulian *(a)* 560
Wanted: A Specialized Foundry *(cp)* 644
Wear Resistant Electroplate, by Abner Brenner, Dwight E. Couch and Eugenia Kellogg Williams *(a)* 114
Welding Air Hardening Steels, by Walter H. Wooding *(a)* 698
Welding and Stress-Corrosion Cracking, by C. E. Pearson and R. N. Parkins *(a)* 508
Welding Armored Vehicles, by R. J. Fowler and L. F. Denaro *(a)* 848
Welding of Armor, by T. L. H. Butterfield *(a)* 580
White Rust on Zinc, by P. T. Gilbert and S. E. Hadden *(a)* 264
World Metallurgical Congress *(cp)* .. 787
X-Ray Studies of Creep in Aluminum, by G. B. Greenough and Edna M. Smith *(a)* 424
ZrC-Cb Cermals, by H. J. Hamjian and W. G. Lidman *(a)* 548

List of Authors

Arbuzov, M. P.—Carbide Phase in Tempered Steel *(a)* 878
Armitage, D. H. and J. Taylor—Centrifugal Castings for Turbines *(a)* 868
Austin, James B., John Chipman, Thomas G. Digges, Elmer Gammeter, Walter E. Jominy, Fred J. Robbins and Ernest E. Thum—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion.. 817
Aytekin, V. and A. H. Cottrell—Creep of Pure Zinc *(a)* 290
Babcock and Wilcox Co., Report No. 3363—Effect of Repeated Machine Welding *(a)* 562
Binder, W. O.—Interchangeability of Cb and Ta in Type 347 Stainless... 219
Bishop, Tom—European Research on Flame Radiation *(c)* 248
High-Temperature Steels and Alloys for Gas Turbines 653
New Type of Cupola *(c)* 376
Bloom, F. K., W. C. Clarke, Jr., and P. A. Jennings—Relation of Structure of Stainless Steel to Hot Ductility 250
Bolz, L. H., D. G. Moore and W. N. Harrison—Ceramic Coatings for Molybdenum *(a)* 872
Bounds, A. M. and H. W. Cooper—Annealing of Titanium and Zirconium 69
Bregman, Adolph—Advances in Production Methods in Metal Finishing 77
Antimony Plate 245
Metal Finishing of Household Equipment at Servel's Plant 646
Brenner, Abner, Dwight E. Couch and Eugenia Kellogg Williams—Wear Resistant Electroplate *(a)* 114
British Intelligence Objectives Subcommittee Over-All Report No. 15—Heat Treatment in Wartime Germany *(a)* 266
British Intelligence Report No. 23—German Light Metal Industry *(a)*.. 426
Bueckle, H.—Protection of Refractory Metals *(a)* 288
Buinov, N. N., P. V. Gel'd and A. I. Kholodov—SiO in Acid Steel *(a)*... 552
Bulian, Walter and Charlotte Siebers—Vibration of Liquid Mg-Al Alloys *(a)* 560
Butterfield, T. L. H.—Welding of Armor *(a)* 580
Cavanagh, P. E. and Harry W. McQuaid—Is the Reduction of Iron Ore by Hydrogen a Commercial Possibility? A Debate 523
Chaston, J. C.—A Decade of Metallurgical Science, With a Rejoinder by Clarence Zener *(c)* 374
Chipman, John, Thomas G. Digges, Elmer Gammeter, Walter E. Jominy, Fred J. Robbins, Ernest E. Thum and James B. Austin—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion 817
Clarke, W. C., Jr., F. K. Bloom and P. A. Jennings—Relation of Structure of Stainless Steel to Hot Ductility 250
Cobb, J. R., Jr. and H. H. Uhlig—Titanium Resists Stress Corrosion *(c)* 816
Colner, William H., Morris Feinleib and Howard T. Francis—Preparation of Very Fine Wire by Electropolishing 795
Cook, Maurice and Edwin Davis—Hot Working of Copper and Alloys *(a)* 116
Cooper, H. W. and A. M. Bounds—Annealing of Titanium and Zirconium 69
Cottrell, A. H. and V. Aytekin—Creep of Pure Zinc *(a)* 290
Couch, Dwight E., Abner Brenner and Eugenia Kellogg Williams—Wear Resistant Electroplate *(a)* 114
Craver, Constance B.—Differentiation of Grain Size and Phases in Titanium 371
Davis, Edwin and Maurice Cook—Hot Working of Copper and Alloys *(a)* 116
Davis, Edwin and Eric Holmes—Pressure-Welded Copper Alloys *(a)* ... 544
Denaro, L. F. and R. J. Fowler—Welding Armored Vehicles *(a)* 848
De Sy, A. L.—Spherulite Formation in Nodular Cast Iron 798
Digges, Thomas G., Elmer Gammeter, Walter E. Jominy, Fred J. Robbins, Ernest E. Thum, James B. Austin and John Chipman—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion 817
Doescher, R. N. and G. E. Zima—Materials for Fluorine Control Equipment 660
Dowdell, R. L. and W. B. F. Mackay—Metal Failures in Aircraft 518
Dunlop, A. and H. E. Gresham—Investment Casting *(a)* 874
Edelman, David L.—Library Use of a New Indexing System 520
Editor, The—Metallurgical Activities at Aberdeen Proving Ground 499
Engel, Walter J.—Bonding of Titanium Carbide With Metal 664
Faupel, J. H.—Cyclic Annealing *(c)* 249
Feinleib, Morris, Howard T. Francis and William H. Colner—Preparation of Very Fine Wire by Electropolishing 795
Few, W. E. and G. K. Manning—4000° Furnace 364
Fowler, R. J. and L. F. Denaro—Welding Armored Vehicles *(a)* ... 848
Francis, Howard T., William H. Colner and Morris Feinleib—Preparation of Very Fine Wire by Electropolishing 795
Gabane, G. and A. Saulnier—Alloys of Al-Zn-Mg-Cu *(a)* 284
Gammeter, Elmer—Corrosion Resistance of Wrought Iron and Steel *(c)* 814
Gammeter, Elmer, Walter E. Jominy, Fred J. Robbins, Ernest E. Thum, James B. Austin, John Chipman and Thomas G. Digges—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion 817
Gel'd, P. V., A. I. Kholodov and N. N. Buinov—SiO in Acid Steel *(a)* 552
Gilbert, P. T. and S. E. Hadden—White Rust on Zinc *(a)* 264
Gilman, John J.—Etching Sigma Phase *(d)* 376-B
Etching Steels Which Contain the Sigma Phase 377
Goodwin, Harry B. and Charles T. Greenidge—Forgeable Arc-Melted Tungsten 812
Greenidge, Charles T. and Harry B. Goodwin—Forgeable Arc-Melted Tungsten 812
Greenough, G. B. and Edna M. Smith—X-Ray Studies of Creep in Aluminum *(a)* 424
Gresham, H. E. and A. Dunlop—Investment Casting *(a)* 874
Guest, G. H.—Review of Tracer Techniques in Metallurgy 366
Hadden, S. E. and P. T. Gilbert—White Rust on Zinc *(a)* 264
Halward, Folke—Flow Test of Hubbing Steel 356
Hamjian, H. J. and W. G. Lidman—ZrC-Cb Cermals *(a)* 548
Hardy, H. K.—Aging of Al-Cu-Ti Alloys *(a)* 864
Harris, Floyd E.—Improvements in Furnaces and Methods for Heat Treatment 63
Harrison, W. N., D. G. Moore and L. H. Bolz—Ceramic Coatings for Molybdenum *(a)* 872
Hart, D. and W. R. Tomlinson, Jr.—Use of Finely Divided Metals in Explosives 788
Hessing, Harold and Hugh L. Logan—Corrosion of Magnesium Alloys *(a)* 408
Hochmann, J.—Vacuum Fusion *(a)*.. 852
Holmes, Eric and Edwin Davis—Pressure-Welded Copper Alloys *(a)* ... 544
Hower, L. D.—MgO-TiN-NiO Cermets *(a)* 506
International Nickel Co., Inc.—Heat Treatment of Age Hardenable High-Nickel Alloys *(d)* 528-B
Ipsen, Harold and R. Krogh—Bright Hardening, Carburizing and Carbonitriding 232
Jacquesson, R. and P. Laurent—Fatigue Strength of Cold Worked Aluminum *(a)* 422
Jennings, P. A., F. K. Bloom and W. C. Clarke, Jr.—Relation of Structure of Stainless Steel to Hot Ductility.. 250
Johnson, R. B.—High-Temperature Problems in Aircraft Jet Engines and Turbo-Superchargers 503
Jominy, Walter E., Fred J. Robbins, Ernest E. Thum, James B. Austin, John Chipman, Thomas G. Digges and Elmer Gammeter—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion 817
Kahles, John F., Norman Zlatin and Richard B. Kropf—High Machinability and Productivity of Ductile Iron 238
Kenworthy, L., R. May and I. G. Slater—Corrosion of Marine Condenser Systems *(a)* 273
Kholodov, A. I., N. N. Buinov and P. V. Gel'd—SiO in Acid Steel *(a)*.... 552

(*a*) Abstract; (*b*) Biography; (*c*) Correspondence; (*cp*) Critical Points; (*d*) Data Sheet.

Klinker, L. G.—Prepared Pastes for Brazing Material 71
Krogh, R. and Harold Ipsen—Bright Hardening, Carburizing and Carbonitriding 232
Kropf, Richard B., John F. Kahles and Norman Zlatin—High Machinability and Productivity of Ductile Iron... 238
Lambert, F. J.—Casting-In of Inconel Tubes in Copper Blocks 809
Lambert, R. A., Reported by—Instrumentation in Steelmaking 657
Landgraf, F. K. and C. A. Zapffe—Mouse and House *(c)* 375
Laurent, P. and R. Jacquesson—Fatigue Strength of Cold Worked Aluminum *(a)* 422
Lewis, John R., Thomas J. Parmley and C. Dean Starr—Variables Encountered in Tracer Experiments in Metallurgy 673
Lidman, W. G. and H. J. Hamjian—ZrC-Cb Cermals *(a)* 548
Logan, Hugh L. and Harold Hessing—Corrosion of Magnesium Alloys *(a)* 408
Low, John R., Jr.—Effect of Shot Peening on the Brittle Transition Temperature *(c)* 248
Mackay, W. B. F. and R. L. Dowdell—Metal Failures in Aircraft 518
Manning, G. K. and W. E. Few—4000° Furnace 364
May, R., I. G. Slater and L. Kenworthy—Corrosion of Marine Condenser Systems *(a)* 273
McDowell, David W., Jr.—Cost of Welding Stabilized Stainless 650
McQuaid, Harry W.—Birth of S.A.E. 4340 669
Ten Years in Steel 55
McQuaid, Harry W. and P. E. Cavanagh—Is the Reduction of Iron Ore by Hydrogen a Commercial Possibility? A Debate 523
Miller, R. R., Compiler—Physical Properties of Some Liquid Metals *(d)* 80-B
Moore, D. G., L. H. Bolz and W. N. Harrison—Ceramic Coatings for Molybdenum *(a)* 872
Morral, F. R.—Aluminum-Rich Binary Alloys *(d)* 672-B
Mudge, W. A.—Age Hardenable High-Nickel Alloys 529
Naesen, G. and F. Zirm—Rolling of Powder Metal *(a)* 586
National Physical Laboratory, England—Pure Iron *(a)* 405
Non-Ferrous Metals Technical Committee, Society of Automotive Engineers—Brass and Bronze Foundry Methods *(a)* 844
Oding, I. A. and E. N. Volosatova—Room Temperature Creep and Relaxation *(a)* 546
Paret, Richard E.—Stainless Is Growing Apace 58
Parkins, R. N. and C. E. Pearson—Welding and Stress-Corrosion Cracking *(a)* 568
Parmley, Thomas J., C. Dean Starr and John R. Lewis—Variables Encountered in Tracer Experiments in Metallurgy 673
Pearson, C. E. and R. N. Parkins—Welding and Stress-Corrosion Cracking *(a)* 568
Pictorial Story—Spherical Pressure Tank Welded from Stainless Plate 516
Polakowski, N. H.—Manufacture of Quality Steel in Russia 359
Poole, Sidney W.—Progress in Electric Steelmaking 93
Raub, Ernst—Chromium-Plated Aluminum *(a)* 412
Raudebaugh, Robert J.—Interconversion of Atomic % and Weight % *(d)* 248-B
Richards, J. T.—Effect of Nuclear Radiation on Metals *(c)* 249
Roast, Harold J.—Research and the Pilot Foundry 668
Robbins, Fred J., Ernest E. Thum, James B. Austin, John Chipman, Thomas G. Digges, Elmer Gammeter and Walter E. Jominy—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion 817
Roth, H. P.—Microstructure of Titanium *(d)* 816-B
Rudorf, S. K.—Tools for High Production 81
Russell, Allen S.—Sparking Magnesium 228
Saulnier, A. and G. Gabane—Alloys of Al-Zn-Mg-Cu *(a)* 284
Schapiro, Leo—Modern Trends in Airframe Materials 511
Schumacher, Earle E.—Pure Metals *(a)* 280
Scrutton, R. F. and W. A. Wood—Mechanism of Primary Creep *(a)*.. 410
Shubrooks, G. E.—Small Watch Parts *(c)* 815
Siebers, Charlotte and Walter Bulian—Vibration of Liquid Mg-Al Alloys *(a)* 560
Slater, I. G., L. Kenworthy and R. May—Corrosion of Marine Condenser Systems *(a)* 273
Smith, Edna M. and G. B. Greenough—X-Ray Studies of Creep in Aluminum *(a)* 424
Spencer, Lester F.—Steel for Plastic Molds *(a)* 402
Stanworth, J. E. —Metal-to-Glass Seal *(a)* 556
Starr, C. Dean, John R. Lewis and Thomas J. Parmley—Variables Encountered in Tracer Experiments in Metallurgy 673
Story, Edward B.—Spinning Flanged and Dished Wrought Iron Heads *(c)* 375
Taylor, J. and D. H. Armitage—Centrifugal Castings for Turbines *(a)* 868
Theisinger, William G.—Origin and Use of Clad Steel Plate 671
Thompson, W.—Free Cone Bend Test *(a)* 840
Thum, Ernest E., James B. Austin, John Chipman, Thomas G. Digges, Elmer Gammeter, Walter E. Jominy and Fred J. Robbins—Saving Precious Alloys by Intelligent Use of Alternatives, Panel Discussion 817
Tomlinson, W. R., Jr. and D. Hart—Use of Finely Divided Metals in Explosives 788
Tour, Sam—Hot Metal Machining ... 793
Uhlig, Herbert H.—Cost of Corrosion *(a)* 414
Uhlig, H. H. and J. R. Cobb, Jr.—Titanium Resists Stress Corrosion *(c)* 816
Urban, Stephen F.—Partial Stabilization of Stainless Steels *(c)* 815
Volosatova, E. N. and I. A. Oding—Room Temperature Creep and Relaxation *(a)* 546
Wassermann, G.—Unconventional Methods in Powder Metallurgy *(a)* 550
Webster, R. R.—Instrumentation for Metallurgy 87
Williams, Eugenia Kellogg, Dwight E. Couch and Abner Brenner—Wear Resistant Electroplate *(a)* 114
Wood, W. A. and R. F. Scrutton—Mechanism of Primary Creep *(a)*.. 410
Wooding, Walter H.—Welding Air Hardening Steels *(a)* 698
Wright, E. C.—More Manganese From American Ores and Slags 347
Yetman, Charles H.—Soft Soldering in Production 74
Zapffe, Carl A.—Hydrogen Theory for Brittle Ship-Plate 802
Zapffe, C. A. and F. K. Landgraf—Mouse and House *(c)* 375
Zener, Clarence—A Rejoinder to a Decade of Metallurgical Science, by J. C. Chaston *(c)* 374
Zima, G. E. and B. N. Doescher—Materials for Fluorine Control Equipment 660
Zirm, F. and G. Naesen—Rolling of Powder Metals *(a)* 586
Zlatin, Norman, Richard B. Kropf and John F. Kahles—High Machinability and Productivity of Ductile Iron... 238

(a) Abstract; (b) Biography; (c) Correspondence; (cp) Critical Points; (d) Data Sheet.